North Cascades Resource Brief

National Park Service
U.S. Department of the Interior

North Cascades
National Park Complex

TOP: American pika in its typical native habitat, a talus patch in the subalpine zone.

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Pika

The American pika (*Ochotona princeps*), a small charismatic mammal related to rabbits and hares (Order Lagomorpha), is primarily constrained to high elevation, rocky mountain slopes in 10 western states, including the Cascades of Washington. They are inhabitants of talus patch environments, surrounded by meadows or shrubs, and require cool microclimates beneath the talus to survive. Pikas do not hibernate and spend much of the summer collecting vegetation, or "haying," to form "haypiles" that they use for forage throughout the winter. Their ability to consume and stockpile large quantities of grasses and forbs serves an important function in nutrient recycling and the overall maintenance of meadow plant diversity and abundance. Pikas are also an important food source for predators such as golden eagles, hawks, and weasels.

Given their restricted range and habitat requirements, and sensitivity to high temperatures, pikas are considered a climate change indicator species. Climate change threatens to impact pikas in multiple ways. Increases in summer temperatures may curtail time spent foraging or haying to meet summer and winter resource needs, which may ultimately reduce survival. Increasing temperature or changes in precipitation patterns during the growing season may affect plant composition and abundance, resulting in pika range contractions to higher elevations. Changes in other climatological parameters, such as a rising snow line that may result in less snow insulation, may expose pikas to additional winter thermal stress. Because of their status as a climate change indicator species and recent petition for listing under the Endangered Species Act, pikas are a high research priority at the North Cascades National Park Complex (NOCA).

Status and Trends

Uncertainty about the status of pikas in NOCA led to a collaborative study between Beartooth Wildlife Research and NOCA beginning in 2009 and continuing in 2010. During the two summer seasons, surveyors collected abundance, distribution, behavioral, habitat and temperature data in up to 115 talus patches to examine biotic and abiotic factors affecting pikas. We found pikas in 74% of talus patches and across the entire range of elevations surveyed, ranging from 351 to 2,130 m. Results from 2009 and 2010 have provided insights into factors affecting pikas.

On large scales, we found that pika abundance was positively correlated with elevation, total talus patch perimeter, and the proportion of vegetation cover in patches, suggesting patches at higher elevations and those with more resources supported larger pika populations. Population growth rates between 2009 and 2010 were positively correlated with the average minimum daily winter temperature, which may be attributed to warmer winter temperatures reducing thermal stress on pikas and increasing over-winter survival. Growth rates were also negatively correlated with elevation, which is likely the result of relatively mild winter conditions at lower elevations and a cool, wet spring that delayed snowmelt at mid and high elevations.

On small scales, abundance was negatively correlated with the minimum temperature recorded beneath the talus surface, suggesting as sub-surface temperatures increased, pika abundance in patches decreased.

Funding from Seattle City Light and Washington's National Park Fund supported a third year of data collection surveys in 2011 to further elucidate climate, habitat, and human-related factors affecting pika populations. Data collected from temperature loggers will provide detailed climate information about winter and summer temperature extremes and gradients between the talus surface and sub-surface, and the date of spring snowmelt in talus patches. This data will provide a baseline from which to examine relationships between climate warming and pika population dynamics.

Discussion

All pika populations are susceptible to climate variability, especially winter conditions, and may experience large fluctuations as a response. Lower elevation pika populations are likely the most susceptible and may be the indicators for continued climate change in NOCA. These populations are at a greater risk of extirpation in part because lower elevations experience warmer summer temperatures at and below the talus surface. Greater variability in winter climate patterns (ie., changing snow levels) may also be detrimental to populations at lower elevations. This research has increased our understanding of pika ecology and their vulnerability to climate change. The information gained provides a baseline for future pika monitoring and can be used to direct management and conservation actions.

TOP: A typical pika habitat consisting of a talus slope surrounded by meadows and shrubs. BOTTOM: A "haypile" of foraged, mixed alpine meadow vegetation.